TRAFFIC POLLUTION AND COGNITIVE FUNCTION IN COMMUNITY-DWELLING SENIORS: THE MOBILIZE BOSTON STUDY

Gregory Wellenius, *Center for Environmental Health and Technology, Brown University, Providence, RI, USA*
Luke Boyle, *Center for Environmental Health and Technology, Brown University, Providence, RI, USA*
Brent Coull, *Department of Biostatistics, Harvard School of Public Health, Boston, MA, USA*
William Milberg, *West Roxbury Department of Veterans Affairs Medical Center, Boston, MA, USA*
Alexandros Gryparis, *Department of Applied Mathematics, University of Crete, Crete, Greece*
Joel Schwartz, *Department of Environmental Health, Harvard School of Public Health, Boston, MA, USA*
Lewis Lipsitz, *Institute for Aging Research, Hebrew SeniorLife, Boston, MA, USA*

Background and Aims: A small number of epidemiologic studies report an association between long-term exposure to traffic pollution and decreased cognitive function, but additional studies are needed. Accordingly, we evaluated the association between long-term exposure to black carbon (a marker of traffic pollution) and cognitive function in a population-based cohort of community-dwelling seniors.
Methods: Between 2005 and 2008, we evaluated cognitive function among 765 elderly participants from the MOBILIZE Boston Study (64% female, aged 64-97 years). Neurocognative assessments included the Mini Mental State Exam (MMSE) and a battery of five tests designed to evaluate verbal memory and executive function. Subjects with moderate or severe cognitive impairment, as determined by an MMSE< 18 were excluded. We geocoded participants' residential addresses and assessed average long-term exposure to traffic pollution in the 12 months prior to neurocognitive assessment using a validated spatiotemporal land-use regression model for black carbon. We used generalized linear models to evaluate the association with an interquartile range increase (IQR: 0.1 $\mu g/m^3$) in predicted black carbon levels.
Results: Adjusting for age, sex, race, history of stroke, and education, an interquartile range increase in predicted residential exposure to black carbon was associated with a 19% (95% Confidence Interval [CI]: 1%, 39%; p=0.032) increase in risk of having an MMSE score in the lowest quartile (MMSE≤25). Further adjustment for household income, smoking history, body mass index, season, and census level covariates attenuated the results slightly (excess relative risk: 17%; 95% CI: -1%, 40%; p=0.060). Among the other tests, only verbal memory functioning was associated with black carbon (p= 0.056).
Conclusions: In this population-based cohort of elderly subjects, long-term residential exposure to traffic pollution was associated with decreased cognitive function. The increasing prevalence of cognitive impairment expected with the aging population underscores the need for additional studies in this area.